Tennessee Tech University  
Lesson Plan Template

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| **Name:** Haley Sharp  **Date:** 4/16/13  **Lesson Title:** A Fraction of a Fraction: Making Sense of Multiplying Fractions **Grade/Level:** 5th |
| **Curriculum Standards** |
| [CCSS.Math.Content.5.NF.B.4](http://www.corestandards.org/Math/Content/5/NF/B/4) Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction.   * [CCSS.Math.Content.5.NF.B.4a](http://www.corestandards.org/Math/Content/5/NF/B/4/a) Interpret the product (*a*/*b*) × *q* as a parts of a partition of *q* into *b* equal parts; equivalently, as the result of a sequence of operations *a* × *q* ÷ *b*. *For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)* |
| **Focus Questions/Big Idea/Goal (List all 3)** |
| **Questions:** How can a model show two fractions being multiplied?  **Big Ideas:** Students will use prior knowledge of multiplication to understand multiplying fractions. Students will learn how to appropriately use models.  **Goals:** Students will be able to show a model for fractions being multiplied and explain why multiplying fractions leads to a smaller product. |
| **Lesson Objective(s)** |
| I can represent two fractions multiplied by each other in the form of a model.  I can explain why the product of two fractions leads to a smaller number. |
| **Vocabulary/ Academic Language** |
| Vocabulary will be introduced during the set and think aloud. Students will have the opportunity to develop fluency during guided and independent practice.   * Whole * Part * Denominator * Numerator * Area Model * Set Model * Area Model |
| **Material/Resources** |
| * An easily divided number of students (any additional students can be used group helpers or counters) * Paper (for teacher use) * Scissors (for teacher use) * Colored Pencils, Crayons, or Markers (for teacher use) * Interactive Board (for teacher use) * Document Camera (for teacher use) * Exit Ticket Quiz (student copies) * Calculator (class set) |
| **Assessment/Evaluation** |
| **Formative*:***  Students will use two sided butterfly to indicate understanding during the set. If a student has a question, or does not understand a concept he or she will hold up the butterfly with the white side showing. If the student understands and is comfortable moving on the butterfly will be held up with the pink side facing the teacher.  During the guided practice the teacher will use Bloom’s Level of Thinking questions to assess students’ understanding. Each student will complete problems on his or her own paper, and select problems will be completed on a personal sized whiteboard. The teacher will use the whiteboard answers as a formative assessment.  **Summative:**  Students will complete an exit ticket at the end of the lesson. This assessment will look for appropriate vocabulary in the rationale segment, and precise models to represent number sentences. Mastery will be 80% correct on the first question. The second question will determine which students can quickly and efficiently work the problems, and will provide an additional challenge. |

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| **Instruction**  **(Include a suggested time for each major activity)** | **List Questions for higher order thinking *These cannot be answered by yes or no.***  **(Identify Bloom’s Level of Thinking)** |
| **Set/Motivator:**  **Time:** 10 minutes   * Students will be asked what they know about fractions. During this time key vocabulary will be reviewed. * The students will be asked to stand in an open part of the room. Students will be introduced to the concept of being part of a whole. The class will represent the whole, and each student will be a part. The class will be asked to make fractions by dividing into groups. The teacher will show the students, on the document camera, what the class would look like in written fraction form. With the teacher’s guidance, students will form set models for fraction multiplication problems. | What is a whole? (Bloom’s level 1: Knowing)  What is a part?  (Bloom’s level 1: Knowing)  What is a denominator?  (Bloom’s level 1: Knowing)  What is a numerator?  (Bloom’s level 1: Knowing)  What is an area model, linear model, and set model?  (Bloom’s level 1: Knowing) |
| **Instructional Procedures/Learning Tasks:**  **Time:** 25 minutes   1. The students will move back to their desks, and the teacher will work a problem. Student will observe while the teacher thinks aloud. Students will use their butterflies to indicate understanding. If less than 90% do not understand the teacher will solve an additional problem. (21/24 students) 2. The teacher will provide multiple guided practice problems. These problems will include different models and a written mathematical reasoning. | What is the written number sentence? (Bloom’s Level 1: Knowing)  How can you illustrate the number sentence in the form of an area, linear, or set model? (Bloom’s level 5: Generating)  Can you solve the equations using and area, linear, or set model? (Bloom’s level 3: Applying)  What number does the model represent? (Bloom’s level 5: Generating)  What statement is appropriate for explaining why a product of two fractions leads to a smaller number? (Bloom’s level 7: Evaluating) |
| **Closure: *Verbalize or demonstrate learning or skill one more time.  May state future learning.***  **Time:** 15 minutes  Students will independently complete a teacher created assessment. (Assessment is attached.) |  |

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| **Adaptations to Meet Individual Needs:**  In my classroom there are two special education students, and one is an English Language Learner. These students will not be in class during the lesson, so these students will be taught the lesson during small group. Any additional students, who do not master the concepts, will join the small group for additional instruction. One student, who will be currently in class is diagnosed and treated for ADHD. This student will be monitored for understanding and staying on task.  Visual-Spatial -The students will learn through area, linear, and set models.  Bodily-kinesthetic - During the set, students will be creating a human fraction.  Interpersonal - Students will be interacting with one another during the set and class discussion.  Intrapersonal - Students will be completing an exit slip during the closure.  Linguistic - Students will be discussing fractions during the guided practice, and students will also write mathematical reasoning on the exit slips.  Logical -Mathematical - Students will use logical skills during all aspects of the lesson.  **Management/Safety Issues:  *Are there any management and/or safety issues that need to be considered when teaching this lesson?***  Student will be reminded of the appropriate speaking level and behavior during the set. Students will be told that independent work is to be completed silently. |
| **Rationale/Theoretical Reasoning:**  This lesson allows students to understand and explain multiplying fractions in several ways, including; area models, linear models, set models, and the traditional number sentence. The student will be provided different opportunities to build on prior knowledge. The teacher will complete a class review on vocabulary, and students will participate a full body fraction model the teacher will follow this with a think aloud. After reaching 90% understanding, the next practice will be guided by the teacher. To close the lesson, the students will complete an exit ticket. By providing different types of learning, several types of intelligence can be expressed. According to Howard Gardner, each individual has seven measurable forms of intelligence. Each individual will have strengths and weaknesses; therefore, a lesson should not focus solely on one type intelligence. See the section above for intelligences addressed within this lesson.  In addition, the lesson provides a hands on experience through manipulatives and physical activity. John Dewey’s theory, learning by doing, stresses the importance of learning through experience. Activities should be meaningful and connected to real life situations. The lesson provides students the chance to be actively involved and make visuals.  Jerome Bruner’s Constructivist Theory states that individuals construct knowledge by comparing new ideas with previous knowledge. This lesson builds on students’ previous knowledge of fractions, and concludes with a class discussion. This class discussion helps students verbally express the new knowledge, while obtaining knowledge from peers.  This lesson also includes the use of scaffolding. Students need a level of instruction, and in order to reach mastery students must gradually become independent in the content. This lesson begins with a think aloud, followed by guided practice, concluding in independent practice. According to Vygotsky’s Zone of Proximal Development, this is an appropriate way to teach student to self-regulate. |
| **References:**  No outside sources were used in this learning segment; however, for students that need additional help the source list bellow will be used for an extension.  Utah State University (2010). Fractions: Rectangle Multiplication Retrieved from:  <http://nlvm.usu.edu/en/nav/frames_asid_194_g_2_t_1.html?from=category_g_2_t_1.html> |
| **Reflections/Future Modifications: *To what extent did the class learn what you intended them to learn?  What will be your next steps instructionally?  What did you learn about your students as learners?  What have you learned about yourself as a teacher?***  Eighty percent of the class reached mastery, the 20% of the class that did not reach mastery will be retaught during small group. I would like to use online manipulatives and real life word problems to enhance these students learning experience. I found out that some of my student really struggled with the concept of dividing a space in multiple fractions. Even after several demonstrations some students still struggled with the concept that once a section has been divided it cannot be dividing again, the division would have to occur on a side that has not been sectioned. I believe showing these students the model cut into piece they would understand the shape could not be cut in the same area twice to represent two different fractions. During this lesson I learned that I have a tendency to push to finish lesson, and this is not fair to my students. I have a sense of urgency, for fear that I will run out of time, but this could cause stress for my students. In the future I will use a more appropriate timing for my students, to ensure that each student has the time he or she needs to learn and retain the new information.  Extensions:  For students who do not meet 80% mastery an addition group lesson will be added. This lesson will include real life scenarios such as collecting date for informational purposes, dealing with money, and/or working with time. |

Math Exit Ticket

Multiplying Fractions

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Directions: Answer the following questions. Make sure you answer ALL parts of the question.

1. What is 1/2 multiplied by 4/7? Use an area model, linear model, or set model to answer the question. Which type of model did you choose? What would the problem look like as an equation? Why is the product of 1/2 multiplied by 4/7 smaller than 1/2 and 4/7?
2. In Aaliyah's grade, 2/3 of the students have a sister. Of the students who have a sister, 1/2 also have a brother. What fraction of the students in Aaliyah’s grade have both a sister and a brother? Use an area model, linear model, or set model to answer the question. Which type of model did you choose? What would the problem look like as an equation? Why is the product of 2/3 multiplied by 1/2 smaller than 2/3 and 1/2?